

WHAT IS CLAIMED IS:

1 1. A mobile communication system having a radio base
2 station and a mobile terminal being able to communicate
3 with said radio base station using a specific radio
4 frequency band comprising:

5 a detecting unit to detect information
6 concerning a moving speed of said mobile terminal
7 (hereinafter referred as a terminal moving speed) on
8 the basis of a received signal from said mobile
9 terminal; and

10 a selection controlling unit to select the use
11 frequency in a higher radio frequency band when said
12 speed information detected by said detecting unit is
13 higher, select the use frequency in a lower radio
14 frequency band when said speed information is lower,
15 and assign said selected use frequency to the
16 communication between said mobile terminal and said
17 radio base station.

1 2. A radio base station being able to communicate with
2 a mobile terminal using a specific frequency band
3 comprising:

4 a radio communicating unit being able to
5 communicate with said mobile terminal using any one
6 of M (M being an integer not less than two) radio
7 frequency bands;

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8 a speed information detecting unit to detect
9 information concerning a moving speed of said mobile
10 terminal on the basis of a received signal from said
11 mobile terminal received by said radio communicating
12 unit; and

13 a use frequency selection controlling unit to
14 select the use frequency in a higher radio frequency
15 band when said information (hereinafter referred as
16 speed information) detected by said speed information
17 detecting unit is higher, select the use frequency in
18 a lower radio frequency band when said information is
19 lower, and assign said selected use frequency to the
20 communication with said mobile terminal.

1 3. The radio base station according to claim 2, wherein
2 a threshold value information about said speed
3 information, which represents a boundary between said
4 higher speed and said lower speed, is determined on
5 the basis of interference power information with
6 communication with said mobile terminal.

1 4. The radio base station according to claim 2, wherein
2 said use frequency selection controlling unit
3 comprises:

4 a notification signal generating unit to
5 generate a selected frequency notification signal for
6 notifying said mobile terminal of the selected use

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7 frequency; and

8 a switching timing instruction signal
9 generating unit to generate a switching timing
10 instruction signal for instructing said mobile
11 terminal of a switching timing to the selected use
12 frequency when receiving a confirmation signal in
13 response to said selected frequency notification
14 signal from said mobile terminal;

15 said radio communicating unit comprises;

16 a control signal adding unit to add said
17 selected frequency notification signal generated by
18 said notification signal generating unit or said
19 switching timing instruction signal generated by said
20 switching timing instruction signal generating unit
21 to a transmitting signal to said mobile terminal; and

22 a confirmation signal extracting unit to
23 extract said confirmation signal from a received signal
24 from said mobile terminal, and transmitting said
25 confirmation signal to said switching timing
26 instruction signal generating unit of said use
27 frequency selection controlling unit.

1 5. The radio base station according to claim 2, wherein
2 said use frequency selection controlling unit
3 comprises a determining unit to compare said speed
4 information detected by said speed information
5 detecting unit with each of $(2 \times M - 1)$ pieces of threshold

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6 value information about said speed information to
7 determine which range of said threshold value
8 information said speed information falls in;

9 said use frequency selection controlling unit
10 selects said use frequency on the basis of a result
11 of determination by said determining unit, and priority
12 information for deciding which radio frequency band
13 should be used for each of a plurality of terminal speed
14 ranges defined by said threshold value information.

1 6. The radio base station according to claim 3, wherein
2 said interference power information is determined on
3 the basis of a signal transmission characteristic of
4 each of said radio frequency bands.

1 7. The radio base station according to claim 3, wherein
2 said use frequency selection controlling unit
3 comprises:

4 a monitoring unit to monitor information about
5 the number of mobile terminals presently in
6 communication;

7 a received signal-to-noise power ratio
8 estimating unit to determine a measured value of a
9 received signal-to-noise power ratio on the basis of
10 a signal received from said mobile terminal by said
11 radio communicating unit; and

12 an interference power ratio information

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13 calculating unit to calculate said interference power
14 information on the basis of said information about the
15 number of mobile terminals monitored by said monitoring
16 unit and said measured value of said received
17 signal-to-noise power ratio.

1 8. The radio base station according to claim 3, wherein
2 said use frequency selection controlling unit
3 comprises:

4 a notification signal generating unit to
5 generate a selected frequency notification signal for
6 notifying said mobile terminal of the selected use
7 frequency; and

8 a switching timing instruction signal
9 generating unit to generate a switching timing
10 instruction signal for instructing said mobile
11 terminal of a switching timing to the selected use
12 frequency when receiving a confirmation signal in
13 response to said selected frequency notification
14 signal from said mobile terminal;

15 said radio communicating unit comprises;

16 a control signal adding unit to add said
17 selected frequency notification signal generated by
18 said notification signal generating unit or said
19 switching timing instruction signal generated by said
20 switching timing instruction signal generating unit
21 to a transmitting signal to said mobile terminal; and

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22 a confirmation signal extracting unit to
23 extract said confirmation signal from a received signal
24 from said mobile terminal, and transmitting said
25 confirmation signal to said switching timing
26 instruction signal generating unit of said use
27 frequency selection controlling unit.

1 9. The radio base station according to claim 3, wherein
2 said use frequency selection controlling unit
3 comprises a determining unit for comparing said speed
4 information detected by said speed information
5 detecting unit with each of $(2 \times M - 1)$ pieces of threshold
6 value information about said speed information to
7 determine which range of said threshold value
8 information said speed information falls in;

9 said use frequency selection controlling unit
10 selects said use frequency on the basis of a result
11 of determination by said determining unit, and priority
12 information for deciding which radio frequency band
13 should be used for each of a plurality of terminal speed
14 ranges defined by said threshold value information.

1 10. The radio base station according to claim 6, wherein
2 said use frequency selection controlling unit
3 comprises:

4 a monitoring unit to monitor information about
5 the number of mobile terminals presently in

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6 communication;

7 a received signal-to-noise power ratio
8 estimating unit to determine a measured value of a
9 received signal-to-noise power ratio on the basis of
10 a signal received from said mobile terminal by said
11 radio communicating unit; and

12 an interference power ratio information
13 calculating unit to calculate said interference power
14 information on the basis of said information about the
15 number of mobile terminals monitored by said monitoring
16 unit and said measured value of said received
17 signal-to-noise power ratio.

1 11. The radio base station according to claim 6, wherein
2 said use frequency selection controlling unit
3 comprises:

4 a notification signal generating unit to
5 generate a selected frequency notification signal for
6 notifying said mobile terminal of the selected use
7 frequency; and

8 a switching timing instruction signal
9 generating unit to generate a switching timing
10 instruction signal for instructing said mobile
11 terminal of a switching timing to the selected use
12 frequency when receiving a confirmation signal in
13 response to said selected frequency notification
14 signal from said mobile terminal;

2014-03-15 01:11:02

15 said radio communicating unit comprises;
16 a control signal adding unit to add said
17 selected frequency notification signal generated by
18 said notification signal generating unit or said
19 switching timing instruction signal generated by said
20 switching timing instruction signal generating unit
21 to a transmitting signal to said mobile terminal; and
22 a confirmation signal extracting unit to
23 extract said confirmation signal from a received signal
24 from said mobile terminal, and transmitting said
25 confirmation signal to said switching timing
26 instruction signal generating unit of said use
27 frequency selection controlling unit.

1 12. The radio base station according to claim 6, wherein
2 said use frequency selection controlling unit
3 comprises a determining unit for comparing said speed
4 information detected by said speed information
5 detecting unit with each of $(2 \times M - 1)$ pieces of threshold
6 value information about said speed information to
7 determine which range of said threshold value
8 information said speed information falls in;

9 said use frequency selection controlling unit
10 selects said use frequency on the basis of a result
11 of determination by said determining unit, and priority
12 information for deciding which radio frequency band
13 should be used for each of a plurality of terminal speed

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14 ranges defined by said threshold value information.

1 13. The radio base station according to claim 10,
2 wherein said use frequency selection controlling unit
3 comprises:

4 a notification signal generating unit to
5 generate a selected frequency notification signal for
6 notifying said mobile terminal of the selected use
7 frequency; and

8 a switching timing instruction signal
9 generating unit to generate a switching timing
10 instruction signal for instructing said mobile
11 terminal of a switching timing to the selected use
12 frequency when receiving a confirmation signal in
13 response to said selected frequency notification
14 signal from said mobile terminal;

15 said radio communicating unit comprises;

16 a control signal adding unit to add said
17 selected frequency notification signal generated by
18 said notification signal generating unit or said
19 switching timing instruction signal generated by said
20 switching timing instruction signal generating unit
21 to a transmitting signal to said mobile terminal; and

22 a confirmation signal extracting unit to
23 extract said confirmation signal from a received signal
24 from said mobile terminal, and transmitting said
25 confirmation signal to said switching timing

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26 instruction signal generating unit of said use
27 frequency selection controlling unit.

1 14. The radio base station according to claim 10,
2 wherein said use frequency selection controlling unit
3 comprises a determining unit for comparing said speed
4 information detected by said speed information
5 detecting unit with each of $(2 \times M - 1)$ pieces of threshold
6 value information about said speed information to
7 determine which range of said threshold value
8 information said speed information falls in;
9 said use frequency selection controlling unit
10 selects said use frequency on the basis of a result
11 of determination by said determining unit, and priority
12 information for deciding which radio frequency band
13 should be used for each of a plurality of terminal speed
14 ranges defined by said threshold value information.

1 15. The radio base station according to claim 13,
2 wherein said use frequency selection controlling unit
3 comprises a determining unit for comparing said speed
4 information detected by said speed information
5 detecting unit with each of $(2 \times M - 1)$ pieces of threshold
6 value information about said speed information to
7 determine which range of said threshold value
8 information said speed information falls in;
9 said use frequency selection controlling unit

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10 selects said use frequency on the basis of a result
11 of determination by said determining unit, and priority
12 information for deciding which radio frequency band
13 should be used for each of a plurality of terminal speed
14 ranges defined by said threshold value information.

1 16. A radio base station employing a communication
2 system having a characteristic that a required
3 signal-to-noise power ratio of a received signal in
4 a mobile terminal changes from a tendency to increase
5 to a tendency to decrease according to a moving speed
6 of said mobile terminal, said radio base station
7 comprising:

8 a radio communicating unit being able to
9 communicate with said mobile terminal using both a
10 frequency belonging to a first frequency band and a
11 frequency belonging to a second frequency band higher
12 than said first frequency band;

13 a speed information detecting unit to detect
14 information concerning a moving speed of said mobile
15 terminal from a signal received from said mobile
16 terminal; and

17 a use frequency selection controlling unit to
18 at least select a frequency belonging to said second
19 frequency band as the use frequency in said radio
20 communication unit when said information detected by
21 said speed information detecting unit is not higher

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22 than information at which said tendency of said
23 characteristic in said first frequency band changes,
24 select a frequency belonging to said first frequency
25 band as the use frequency in said radio communicating
26 unit when said information detected by said speed
27 information detecting unit is not lower than speed
28 information at which said tendency of said
29 characteristic in said second frequency band changes.

1 17. A radio apparatus being able to use both a
2 frequency belonging to a first frequency band and a
3 frequency belonging to a second frequency band higher
4 than said first frequency band for communication on
5 forward and reverse links with a mobile terminal, said
6 radio apparatus comprising:

7 a transmitting unit to convert a signal
8 obtained by error-correction-encoding and interleave
9 transmitting data into a radio signal, and transmit
10 said radio signal for communication on the forward link
11 to said mobile terminal;

12 a transmitting power controlling unit to
13 control a transmitting power of said radio signal for
14 communication on the forward link on the basis of a
15 received signal from said mobile terminal; and

16 a selection controlling unit to use a frequency
17 belonging to said second frequency band for
18 communication with said mobile terminal when

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19 determining that a fading cycle of the received signal
20 from said mobile terminal or a moving speed of said
21 mobile terminal is fast, use a frequency belonging to
22 said first frequency band for communication with said
23 mobile terminal when determining that said fading cycle
24 or said moving speed of said mobile terminal is slow.

1 18. A radio apparatus being able to use both a
2 frequency belonging to a first frequency band and a
3 frequency belonging to a second frequency band higher
4 than said first frequency band for communication on
5 forward and reverse links with a mobile terminal, said
6 radio apparatus comprising:

7 a transmitting unit to convert a signal
8 obtained by encoding and interleaving transmitting
9 data into a radio signal, and transmit said radio signal
10 for communication on the forward link to said mobile
11 terminal;

12 a transmitting power controlling unit to
13 control a transmitting power of said radio signal for
14 communication on the forward link on the basis of a
15 received signal from said mobile terminal; and

16 a selection controlling unit to use a frequency
17 belonging to said second frequency band in
18 communication with said mobile terminal when
19 determining on the basis of said received signal from
20 said mobile terminal that a fading cycle in a received

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21 signal on the forward link received by said mobile
22 terminal or a moving speed of said mobile terminal is
23 fast, use a frequency belonging to said first frequency
24 band in communication with said mobile terminal when
25 determining that said fading cycle or said moving speed
26 of said mobile terminal is slow.

1 19. A mobile terminal being able to communicate with
2 a radio base station using a specific radio frequency
3 band comprising:

4 a radio communicating unit being able to
5 communicate with said radio base station using any one
6 of M (M being an integer not less than two) radio
7 frequency bands;

8 a selected frequency notification signal
9 receiving unit to receive, from said radio
10 communicating unit, a selected frequency notification
11 signal for notifying of a use frequency selected among
12 higher radio frequency bands in said radio base station
13 when speed information of its own is faster or selected
14 among lower radio frequency bands when the speed
15 information of its own is slower; and

16 a use frequency selection controlling unit to
17 select a radio frequency to be used in said radio
18 communicating unit among said radio frequency bands
19 according to said selected frequency notification
20 signal received by said selected frequency

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21 notification signal receiving unit.

1 20. The mobile terminal according to claim 19 further
2 comprising:

3 a confirmation signal transmitting unit to
4 transmit a confirmation signal in response to said
5 selected frequency notification signal to said radio
6 base station;

7 a switching timing instruction signal
8 receiving unit to receive a switching timing
9 instruction signal as a response to said confirmation
10 signal from said radio base station;

11 said use frequency selection controlling unit
12 to execute a switching to a radio frequency notified
13 by said selected frequency notification signal at a
14 timing defined by said switching timing instruction
15 signal received by said switching timing instruction
16 signal receiving unit.

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